

## Navdeep Gogna

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### Work Experience:

- Jackson Laboratory, Bar Harbor, Maine** 2019 – Present  
Supervisor: Prof. Patsy Nishina
- MDI Biological Laboratory, Bar Harbor, Maine** 2018- 2019  
Supervisor: Dr. Vicki Losick
- Indian Institute of Science Education & Research, Mohali, India** 2010- 2012  
Research Fellow  
Area of research: Protein extraction & structure determination using NMR spectroscopy

### Education:

- Indian Institute of Science Education & Research, Mohali, India.** 2013-2018  
PhD in Biophysics  
Area of research: NMR-based metabolomics  
Supervisors: Dr. Kavita Dorai & Dr. N G Prasad
- Panjab University, Chandigarh, India** 2010  
Masters in Science (Biotechnology)
- Guru Nanak Dev University, Amritsar, India** 2007  
Bachelors in Science (Biotechnology)

### Research experience:

#### MDI Biological Laboratory

Postdoctoral Fellow

Project: Using *Drosophila* as a model organism, to identify genes responsible for polyploidy phenotype associated with degenerative eye diseases in mouse and human.

- Using *Drosophila* genetics to identify genes associated with polyploid phenotype in *Drosophila* abdominal epithelium.
- Identifying mouse and human gene orthologs conserved for similar polyploid defects in both *Drosophila* abdominal epithelium and mouse retinal pigment epithelium.

#### Skills acquired:

- *Drosophila* care, husbandry and genetics including stock maintenance, generating RNAi fly lines, using GAL4-UAS expression system and immunohistochemical staining (IHC) and visualization of fluorescent tagged proteins.
- Biomethods training for mice handling & restraint, sex determination, ear notching, tail tipping, CO2 euthanasia, secondary euthanasia via cervical dislocation, pup decapitation.
- Mice eyeball extractions and dissection for obtaining retinal pigment epithelium (RPE) and immunohistochemical staining for visualization of polyploidy cells in RPE.

**Indian Institute of Science Education & Research, Mohali, India.**

Graduate student

**Studied several metabolomic response studies in a wide variety of organisms using NMR-based metabolomic approach:**

- *Serum metabolomics* - Investigated diabetic/non-diabetic, high/low BMI individuals to identify potential metabolite biomarkers for early detection of diabetes in non diabetic-obese individuals.
- *Fly metabolomics* - evolution of metabolome in response to increased immunity and impact of aging on immune response in *D.melanogaster*; metabolite changes due to dispersion in *D.melanogaster*; metabolites showing circadian clock in *D.melanogaster*.
- *Plant metabolomics* - Studied the impact of fungicides on wheat seed germination using NMR; identified and quantified medicinally significant metabolites in different parts of plant *Carica papaya* using NMR & MS; identified metabolites showing circadian rhythm in *Helianthus annuus* using NMR & MS; identified metabolic response to touch in *Mimosa pudica* using NMR & MS; identified adulteration in plant herbal trade in *Saraca asoca* using NMR; identified metabolites responding to pollution and circadian rhythm in *Bougainvillea* using NMR & MS.

**Skills acquired:**

- Proficient in metabolomic studies using NMR spectroscopy and Mass spectrometry (MS).
- Hands-on experience with databases and multivariate statistical analysis softwares (TOPSPIN, MassLynx, Mnova, SIMCA, Metaboanalyst, Metabohunter, Metabominer, HMDB, MMCD, BMRB) frequently used for metabolomic studies.
- Familiar with protein structure determination using NMR.
- Hands-on experience in molecular biology techniques and protein chemistry including spectroscopy, chromatography and protein expression.
- Experience in working with mice and insects as model organisms.

**Masters thesis Project:** Study of Biodegradation characteristics of fungus *Coriolus Versicolor* using triphenyl methane dyes. (Involved culturing fungal cells and estimating dye degradation using spectrophotometer )

**Publications**

[Google scholar profile](#)

1. [Navdeep Gogna](#), Murahari Krishna, Anup Mammen Oommen, Kavita Dorai. Investigating correlations in the altered metabolic profiles of obese and diabetic subjects in a South Indian Asian population using an NMR-based metabolomic approach. [Molecular BioSystems. 2015; 11\(2\): 595-606](#)  
(This article was part of the themed collection: 2015 Hot Articles in Molecular BioSystems).
2. [Navdeep Gogna](#), Kavita Dorai. HR-MAS NMR-based metabolomic approach to study the effect of fungicidal stress on wheat seed germination. [Current Science. 2015; 108\(9\): 1694-1701.](#)
3. [Navdeep Gogna](#), Neda Hamid, Kavita Dorai. Metabolomic profiling of the phytochemical constituents of *Carica papaya* L. leaves and seeds by <sup>1</sup>H NMR spectroscopy and multivariate statistical analysis. [Journal of pharmaceutical and biomedical analysis. 2015; 115: 74-85.](#)  
(Most read article of the month)

4. Navdeep Gogna, Viveka Jagdish Singh, Sheeba Vasu, Kavita Dorai. NMR-based investigation of the *Drosophila melanogaster* metabolome under the influence of daily cycles of light and temperature. [Molecular BioSystems. 2015; 11\(12\): 3305-3315.](#)
5. Santhosh Kumar Jayanthinagar Urumarudappa, Navdeep Gogna, Steven G Newmaster, Krishna Venkatarangiah, Ragupathy Subramanyam, Seethapathy Gopalakrishnan Saroja, Ravikanth Gudasalamani, Kavita Dorai, Uma Shaanker Ramanan. DNA barcoding and NMR spectroscopy-based assessment of species adulteration in the raw herbal trade of *Saraca asoca* (Roxb.) Wiiiid, an important medicinal plant. [International Journal of Legal Medicine. 2016; 130\(6\): 1457-1470.](#)  
(Featured in national newspapers)
6. Rakesh Sharma, Navdeep Gogna, Harpreet Singh, Kavita Dorai. Fast profiling of metabolite mixtures using chemometric analysis of a speeded-up 2D heteronuclear correlation NMR experiment. [RSC Advances. 2017. 7\(47\): 29860-29870.](#)
7. Navdeep Gogna, Rakesh Sharma, Vanika Gupta, Kavita Dorai, N G Prasad. Evolution of the metabolome in response to selection for increased immunity in populations of *Drosophila melanogaster*. [PloS ONE. 2017; 12\(11\): e0188089.](#)
8. Sajitha T P, Manjunatha B L, Navdeep Gogna, Kavita Dorai, Ravikanth G, Uma Shaanker R. Mechanism of resistance to camptothecin, a cytotoxic plant secondary metabolite, by a hairy caterpillar, *Lymantria sp* [J Chem Ecol. 2018; 1-10.](#)
9. Sudipta Tung, Abhishek Mishra, Navdeep Gogna, Mohammed Aamir Sadiq, PM Shreenidhi, VR Shree Sruti, Kavita Dorai, Sutirth Dey. Evolution of dispersal syndrome and its corresponding metabolomic changes. [Evolution. 2018; 72\(9\): 1890-1903.](#)
10. Sajitha T P, Siva R, Navdeep Gogna, Kavita Dorai, Manjunatha B L, Rajani P, Ravikanth G, Uma Shaanker. Sequestration of the plant secondary metabolite, Colchicine by *Polytela gloriosae*. [Chemoecology. 2019; 29\(4\): 135-142.](#)
11. Soujanya K N, Siva R, Mohana K P, Ravikanth G, Rajani P, Navdeep Gogna, Kavita Dorai, Uma Shaanker R. Camptothecin producing endophytic fungi from *Pyrenacantha volubilis* Hook. and the role of epigenetic modifiers in restoring camptothecin production in attenuated fungus. (Manuscript under review).
12. Sumit Mishra, Navdeep Gogna, Kavita Dorai. NMR-based investigation of the altered metabolic response *Bougainvillea spectabilis* leaves exposed to air pollution stress during the circadian cycle. [Environmental and Experimental Botany. 2019; 164, 58-70.](#)
13. Navdeep Gogna, Sumit Mishra, Kavita Dorai. NMR-based identification of the cycling metabolites in *Helianthus* (Sunflower) plants grown under natural sunlight conditions. (Manuscript submitted).
14. Navdeep Gogna, Sumit Mishra, Kavita Dorai. NMR-based metabolomic study of leaf response to external stimuli in *Mimosa pudica* plant. (Manuscript submitted).
15. Navdeep Gogna, Boddu Satya Spandana, Sumit Mishra, Neetika Ahlawat, Kavita Dorai, N G Prasad. NMR-based metabolomic investigation of the evolution of immunity in a population of

*Drosophila melanogaster* evolved for increased immunity, across different ages. (Manuscript submitted).

### Participations:

- Assisted in preparations for the *Drosophila* as a Model for Human Health and Disease course at MDI Biological Laboratory, Bar Harbor 2019.
- Attended ‘Polyploidy in Organ Development, Repair, and Disease’ symposium at MDI Biological Laboratory, October 13-14th, 2018.
- Presented a talk at **NMRS 2015** at Guru Nanak Dev University (GNDU), Amritsar, India March 6<sup>th</sup> -9<sup>th</sup> 2015.
- Presented a poster at **EUROMAR 2013** at Hersonissos, Crete, Greece June 30<sup>th</sup>-July 5<sup>th</sup> 2013.
- Presented a poster at **NMRS 2012** at Indian Institute of Science (IISc), Bangalore, India February 5<sup>th</sup> – 8<sup>th</sup> 2012.
- **Seminar on Climate, Carbon and Copenhagen**, held at Panjab University, Chandigarh, organised by Society for Promotion of Science & Technology in India, Feb 17th 2010.
- International conference on **NMR at the interface of physics, chemistry and biology**, IISER Mohali, November 29<sup>th</sup>-30<sup>th</sup> 2010.
- **‘International Conference On Understanding And Managing Pathogenic Microbes 2010’** by IMTECH, Chandigarh, India January 22<sup>nd</sup>-24th 2010..
- **‘Microcon 2009’** by Panjab University, Chandigarh, India March 3<sup>rd</sup>- 4<sup>th</sup> 2009.
- **National Symposium on Animal Remodelling** by Postgraduate Institute of Medical Education and Research (PGIMER-INSIA sponsored), Chandigarh, India October 3rd 2009.
- **National Symposium on Recent Advances in Biological Sciences**, held by DAV College, Chandigarh, India November 6<sup>th</sup>-7<sup>th</sup> 2009.
- Science Exhibition **‘In The Emerging Areas Of Physical And Biological Sciences’** on January 20<sup>th</sup> 2007 at HRMMV College, India - **Presented a working model on FISH (Fluorescence in situ hybridization) and received a prize for the same.**

### References

- Dr. Vicki P Losick**, Assistant Professor, MDI Biological Laboratory, Bar Harbor, Maine. Email: [vlosick@mdibl.org](mailto:vlosick@mdibl.org)
- Dr. Kavita Dorai**, Professor, IISER Mohali, India. Email: [kavita@iisermohali.ac.in](mailto:kavita@iisermohali.ac.in)
- Dr. N G Prasad**, Associate Professor, IISER Mohali, India. Email: [prasad@iisermohali.ac.in](mailto:prasad@iisermohali.ac.in)
- Dr. Sheeba Vasu**, Assistant Professor, JNCASR, Bangalore, India. Email: [sheeba@jncasr.ac.in](mailto:sheeba@jncasr.ac.in)